



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/606,523	06/26/2003	Alessandro C. Callegari	YOR920000655US2	5736

7590 05/04/2005

Frank Chau
F. CHAU & ASSOCIATES, LLP
Suite 501
1900 Hempstead Turnpike
East Meadow, NY 11554

EXAMINER

PADGETT, MARIANNE L

ART UNIT	PAPER NUMBER
----------	--------------

1762

DATE MAILED: 05/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/606,523

Applicant(s)

CALLEGARI ET AL.

Examiner

Marianne L. Padgett

Art Unit

1762

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 8-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 8-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

Art Unit: 1762

1. The disclosure is objected to because of the following informalities: The preliminary amendment of 6/26/03 made to p. 1, line 3, needs to be updated to show the current status of the parent case, as PN 6,665,033.

Appropriate correction is required.

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. Claims 8-11 & 14-19 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-6 of U.S. Patent No. 6,665,033 B2. Although the conflicting claims are not identical, they are not patentably distinct from each other because these present claims are generic to the more narrow species of the allowed claims from the parent, case PN 6,665,033, except where the ranges of alignment layer, generic or diamond like carbon (DLC) overlap by being claimed in the present independent claim 14, but are the same relationship in this case's claim 8-9. In claim 14, the intended use in the preamble adds no life to the claim, so is not patentably significant. In claim 8, "quenching ...with reactive component to saturate..." and in claim 14 "saturating dangling bonds..." are generic and encompass the patented limitation of "introducing reactive gas to the ion beam to

Art Unit: 1762

saturate...". Similarly, the above claims with limitations to use of reactive gas or reactive gas ions are the same as or slightly more general than the patent claim limitations, since the patent claims must include "at least one of silane and tetrafluoromethane", where at least one the gases claimed in each depend patent claim is in one of the present ones, where claim 16 is also noted to overlap with the gases of claim 1 in claiming "silane and tetrafluoromethane", although there are two 112 problems therein of a missing comma and either incorrect dependent or no clear connection to the limitation of the independent claim 14 to claim 16's "the reactive gas", but as the intent appears the same as the patented claims, it is included here. Note that any gas input into the ion beam, either at its source or so that it flows with the ion beam, is still quenching or saturating the dangling bonds at the surface.

Note that the claims that treat with a liquid, are not included as they are a significantly different species of reactive component.

4. Claims 8-11 and 14-19 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-2, 5-7, 9, 12 and 14 of U.S. Patent No. 6,485,614 B2 (Kato et al). Although the conflicting claims are not identical, they are not patentably distinct from each other, because again the present claims are broader and encompass the patent claims. Although there are no overlapping inventors, it is noted inventor to Kato et al and the present case are both listed on patents to IBM, and as this case's parent was filed and Kato were filed on the same date, so while Kato is not prior art, if ownership is common as suggested by copending patents, this rejection is appropriate. Note that atomic hydrogen is inclusive of H^+ , hence a beam of it is equivalent to or encompasses an ion

Art Unit: 1762

beam of H^+ , and that the patent's passivating limitations are considered analogous or equivalent to the instant quenching and saturating limitations.

5. Claims 8, 10, 11 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-2, 9-11 and 17 of U.S. Patent No. 6,061,114 (Callegari et al). Although the conflicting claims are not identical, they are not patentably distinct from each other, because again the patent (114) claims are to an overall narrow set of limitations being directed to particular processes for forming the alignment layer, while the instant claims are generically "providing" it, then ion bombarding and/or gas treating it with a process that encompasses the patent claims, as the like reactive gases or ions used in the same environment would have been expected to inherently have the same effect.

6. Claims 8-11 and 14-19 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Callegari et al (6,061,114).

Note this rejection will be removed by showing common ownership, as the inventive entities are different, but have overlapping inventors, and as the case was filed after November 29, 1999.

In addition to claims in Callegari et al (114), there is further disclosure to the alignment layer used being DLC (col. 3, lines 51-60; col. 4, lines 54-63; col. 5, lines 51-col. 6, lines 35 and 51- col. 7, lines 5) including specific material of DLC to be treated by the claimed ion bombardment techniques, and col. 7, lines 23-30 noting that other dry processing techniques besides PECVD may be used, do not specify the specific ones, however figure 9 is an ion beam generating device form a plasma source.

Art Unit: 1762

7. Claims 8, 10-11 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over IBM Tech. Disc. Bull., vol. 34, #4B.

The IBM Tech Disc. Bull. ion bombards polyamide alignment film with ions created from a mixture of N₂ and Ar gas, hence a reactive and an inert gas. While the ions will inherently react to create dangling bonds, the nitrogen will in turn inherently react with them due to the chemistry, thus quenching them. As the Bulletin states that there is no electrostatic damage from the process, this suggests that there is no remaining residual charge at the end of the process, such that any radicals (i.e. dangling bonds) created have been saturated. When steps are essentially the same, results must be considered inherently the same, unless differentiated. Alternatively, it would have been obvious to one of ordinary skill in the art to balance their parameters, such as gas proportions, pressures, etc, such that optimum surface treatment results, which would have included not creating a charge build up which could cause damage (i.e., is essentially taught to be undesirable).

8. Claims 8 and 12-13 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Chaudhari et al (5,770,826).

Chaudhari et al (826) teach ion treating a polyimide alignment surface with a low energy Ar⁺ beam to provide orientation, then subsequently had neumatic liquid crystal (LC) applied to it when used with a pair of glass plates with the space between them evacuated (abstract; col. 3, lines 4-65). While Chaudhari (826) do not discuss any dangling bonds created by the ion beam being quenched or saturated by the LC, any that remained at time of exposure would inherently have been quenched or saturated given the complete exposure to the claimed liquid. Note for the claims as written, it does not matter how many of the dangling bonds might have been created,

Art Unit: 1762

nor how many remain at the time of exposure to the LC, as there are no time or quantity limits, and the claims are “comprising”, so can include other reactions, as well as reaction to gases as well as the LC (although there are no such necessarily present, exposure to air before the LC is not excluded as the transition from the ion beam treatment to the LC-containing structure is not given). Alternately, it would have been obvious to one of ordinary skill to follow the procedure given in Chaudhari et al with minimum possible exposure to contaminants, hence minimal exposure to air as suggested by the evacuated space, and with minimal delay to avoid storage time and possible contamination during it, hence reactive sites or dangling bonds created during the ion beam alignment process would have been expected to be present to be quenched when the LC was applied.

9. Pierson et al (2001/0025826 A1) is cited for its teaching of how reactive gases present when ion etching is occurring reduce the amount of ion-induced crystal damage [0013+].

Nakabayashi et al (5,710,608) can be considered analogous to Chaudhari et al (826) as applied above, as it also may perform an ion beam (IB) alignment/orientation step, where the next step would be exposure to the LC, which is described as being aligned by a plurality of very small channels formed by the IB. Shimada et al (5,036,322) has disclosures like Nakabayashi et al.

10. Claims 8 & 12-13 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 24-25, 34-36 of U.S. Patent No. 6,724,449 B1 (Andry et al). Although the conflicting claims are not identical, they are not patentably distinct from each other, because the present claims are broads and encompassed the

Art Unit: 1762

narrower claims recited in the patent, which are thus of overlapping scope, and obvious variations. Also see comments in section 8 above.

11. Claims 8 and 12-13 are rejected under 35 U.S.C. 102(b) as being anticipated by Andry et al (449 B1).

See section 10 above, and note common ownership will remove this rejection, which is to different invention entities, but overlapping inventors.

12. Claims 8, 12-13, 14 and 20-21 are rejected under 35 U.S.C. 102(e) as being anticipated by Lien et al (6,682,786 B1).

Lien et al is also to different invention entirely, but overlapping inventors, with a filing date before the effective on of this case.

In Lien et al (786), note the col. 3, lines 21-40 discussion on energy beams causing broken bonds, i.e., dangling bonds, and see discussion on col. 6, lines 7-60 on various alignment layers, including polymeric (fluorinated preferred) or DLC (line 17); then use of energy beams on col. 6, line 63-col. 7, line 14, where ion beam is particularly specified for use on the disclosed alignment layer on line 6. Thereafter, the treated layer is exposed to LC molecules, as per disclosure of USPN 5,770,826, which was incorporated by reference, and also discussed in section 8 above.

13. Claims 8, 12-13, 14 and 20-21 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim26 of U.S. Patent No. 6,519,018 B1 (Samant et al). Although the conflicting claims are not identical, they are not patentably distinct from each other, because the claim 20 of (018) provides various alignment layers including DLC, ion beam treats with more detail, then contacts with LC, hence lacking

Art Unit: 1762

any necessary distinguishing or critical steps, like steps are assumed to inherently produce like results. Note the energies claimed in Samant et al are consistent with those taught in applicants' specification applied to DLC alignment layers, so equivalent dangling bond effects would have been expected to be inherent or the same as no apparent or critically different parameter or step is used.

14. Claims 8, 12-14 and 20-21 are rejected under 35 U.S.C. 102(e) as being anticipated by Samant et al (018B1)

See above discussion in section 13.

15. Claims 8, 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakabayashi et al (5,710,608) or Shimada et al (5,030,322), in view of Pierson et al (2001/0025826 A1).

Nakabayashi et al (abstract, Figures; summary; col. 2, lines 54-67; col. 3, lines 45-54 and col. 4, lines 12-44) and Shimada et al (abstract; figures; col. 2, lines 14-23; col. 6, lines 6-42), both disclose use of inert ions to treat alignment layers, but do not disclose reactive gas then or concurrently applied to the substrate or with the treatment (although in Shimada et al, the previous step had such gases, but there is no indication of their presence in the next step). Note, that ion beams would have inherently induced dangling bonds in their treatment of the surface.

Pierson et al, as mentioned above in section 9, teach how reactive gases will reduce ion induced crystal damage, but still allow other intended processes, such as etching effects, to provide, possibly more efficiently, hence it would have been obvious to use such a technique to favorably effect the orientation treatment and prevent defects that may detract from the alignment process. Pierson mentions gases such as N₂ to control effects and inert gases (Ar) may

Art Unit: 1762

also be present, but it would have been further obvious to choose a gas according to the material being treated, and the other gases of the Markush group are well known reactive gases, that would have been obvious to use depending on the composition of layer being treated.

16. Other art of interest to the state if the art includes Chaudhari et al (2003/0210371 A1), Andry et al (6,660,341 B2) and Yamada et al (6,844,905 B2).

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to M L. Padgett whose telephone number is (571) 272-1425. The examiner can normally be reached on Monday-Friday from about 8:30 am to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached at (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

M. L. Padgett/af
April 13, 2005
May 2, 2005


MARIANNE PADGETT
PRIMARY EXAMINER